U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

SEP 27 2000

DOT-E 8718
(SEVENTH REVISION)

EXPIRATION DATE: August 31, 2002

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Structural Composites Industries
Pomona, CA

2. PURPOSE AND LIMITATIONS:

a. This exemption authorizes the manufacture, marking and sale of a non-DOT specification cylinder for use as an equipment component aboard aircraft and marine craft for the transportation in commerce of certain Division 2.2 gases. This exemption provides no relief from any regulation other than as specifically stated herein.

b. An exemption authorization to manufacture, mark, sell, and transport only represents certification of safety for a package when it is an article of commerce in transportation. The safety analyses performed in development of this exemption only considered the hazards and risks associated with transportation in commerce. The safety analyses did not consider the hazards and risks associated with consumer use, use as a component of a transport vehicle or other device, or other uses not associated with transportation in commerce.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR § 173.302(a), § 173.304(a), § 175.3 in that non-DOT specification cylinders are authorized.

5. BASIS: This exemption is based on the applications of Structural Composites Industries, dated September 5, 2000 submitted in accordance with § 107.109 and supplemental information September 25, 2000.

6. HAZARDOUS MATERIALS (49 CFR § 172.101):

Hazardous materials description -- proper shipping name	Hazard Class/ Division	Identification Number	Packing Group
Air, compressed	2.2	UN1002	N/A
Oxygen, compressed	2.2	UN1072	N/A
Helium, compressed	2.2	UN1046	N/A
Nitrogen, compressed	2.2	UN1066	N/A
Carbon dioxide	2.2	UN1013	N/A
Bromotrifluoromethane *or* Refrigerant gas, R 13B1	2.2	UN1009	N/A
Compressed gas, n.o.s.	2.2	UN1956	N/A

7. PACKAGING(S) and SAFETY CONTROL MEASURES:

Packaging prescribed is a non-DOT specification fiber reinforced plastic (FRP) full composite (FC) cylinder in full compliance with SCI's specification SCI Special Reports on file with the Office of Hazardous Materials Exemptions and Approvals (OHMEA), and with DOT FRP-1 Standard Revision 2 dated February 15, 1987 (§ 178.AA), contained in Appendix A of this exemption except as follows:

§ 178.AA-2 Type, size and service pressure. Type 3FC cylinder consisting of resin impregnated continuous filament windings in both longitudinal and circumferential directions over a seamless aluminum liner; not over 150 pounds water capacity (4091 cubic inches); and service pressure at least 900 psi but not greater than 4500 psi.

§ 178.AA-4 Duties of Inspector

* * *

(b) add an additional sentence which reads: In lieu of testing for filament material properties by the exemption holder, a certificate by the filament manufacturer is acceptable provided that the procurement document specifies strength and quality requirements and that the supplied material is certified to those requirements.

§ 178.AA-5 Authorized material.

(a) Aluminum liner must be 6351 or 6061 alloy and T6 temper. Aluminum 6351 alloy is not authorized for new construction.

(b) Filament material must be either commercial type-S fiberglass, or Kevlar 49 in compliance with proposed Aerospace Materials Specification (AMS) 3901. Filaments must be tested in accordance with ASTM D-2343 (strand test) and ASTM D-3317 (denier test) and the strength and denier must be as follows:

(1) Strand strength - 450,000 psi

(2) Denier - not less than 90 percent of nominal value specified in AMS 3901.

* * * * *

§ 178.AA-7 Wall thickness.

(a) Thickness of liner must be in compliance with the design analysis report and must be such that after autofrettage, the compressive stress in the sidewall of the liner at zero pressure will not cause buckling of the liner. Liner thickness must be sufficient to pass the prescribed design qualification test in § 178.AA-18 of this exemption.

* * * * *

§ 178.AA-10 Pressure relief devices and protection for valves, relief devices, and other connections.

(a) Pressure relief devices and protection for valves and other connections must be in compliance with § 173.34(d), and § 173.301(g), except that the adequacy of the pressure relieving devices for each design must be verified in accordance with § 178.AA-18(g) not withstanding the requirement in CGA Pamphlet C-14.

§ 178.AA-12 Destructive tests.

* * *

(b)(1) Applies except that the rate of cycling may not exceed 10 cycles per minute.

§ 178.AA-13 Acceptable results of test.

(a) * * *

(b) * * *

(c) Cycling test.

(1) Each test cylinder must withstand at least 1,000 pressurization between approximately zero and service pressure followed by at least 30 pressurization between zero and test pressure without evidence of distortion or failure.

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§ 178.AA-15 Markings

(a) * * *

(b) * * *

(c) * * *

(d) (Added). Each cylinder must be marked "Must not be used after 15 years or 100 pressurization (including topping off) whichever comes first.

§ 178.AA-18 Design qualification tests.

(a) * * *

(b) * * *

(c) * * *

(d) Pressure cycling test. * * * Applies except that the rate of cycling may not exceed 10 cycles per minute.

(1) Cycling test at ambient temperature - Two representative cylinders must be cycle tested at ambient temperature as follows without showing evidence of distortion, deterioration or failure as follows: pressurize from zero to service pressure for 1,000 cycles, then pressurize from zero to test pressure for 30 cycles. After successfully passing this test, one cylinder must be pressurized to burst in accordance with (e)(1) of this section and the burst pressure recorded. The other must be cycled to failure from zero to service pressure and total number of cycles must be recorded.

(2) Environmental cycling test. * * *

(ii) Pressurize from zero to service pressure for 500 cycles at 140 degrees F. or higher and 95% or greater relative humidity.

(iii) * * *

(iv) Then pressurize from zero to service pressure for 500 cycles at minus 60 degrees F or lower.

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(3) Thermal cycling test. * * *

(i) Cycle test, at ambient temperature, by performing 1,000 pressurization from zero to service pressure, and 30 pressurization from zero to test pressure.

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8. SPECIAL PROVISIONS:

a. In accordance with the provisions of Paragraph (b) of § 173.22a, persons may use the packaging authorized by this exemption for the transportation of the hazardous materials specified in paragraph 6, only in conformance with the terms of this exemption.

b. A person who is not a holder of this exemption, but receives a package covered by this exemption, may reoffer it for transportation provided no modifications or changes are made to the package and it is offered for transportation in conformance with this exemption and the HMR.

c. A current copy of this exemption must be maintained at each facility where the package is offered or reoffered for transportation.

d. Each packaging manufactured under the authority of this exemption must be either (1) marked with the name of the manufacturer and location (city and state) of the facility at which it is manufactured or (2) marked with a registration symbol designated by the Office of Hazardous Materials Exemptions and Approvals for a specific manufacturing facility.

e. A current copy of this exemption must be maintained at each facility where the package is manufactured under this exemption. It must be made available to a DOT representative upon request.

b. Cylinder service life must not exceed 15 years, or 100 pressurization (including topping off), whichever comes first.

c. Cylinders used in oxygen service must be equipped with brass or stainless steel valves; must have a marked service pressure not exceeding 3000 psig; and must be cleaned in compliance with Federal Specification RR-C-901b dated August 1, 1967, paragraph 3.7.2 and 3.8.2. One cylinder selected at random from each 200 or less cylinders cleaned at the same time must be tested for oil contamination as prescribed in RR-C-901b, paragraph 4.4.2.3 and meet the standard of cleanliness specified.

d. Cylinder must be packaged in accordance with § 173.301(k).

e. Each cylinder must be reinspected and hydrostatically retested every three years in accordance with § 173.34(e) as prescribed for DOT 3HT cylinders, except that the rejection elastic expansion criteria does not apply, permanent volumetric expansion must not exceed 5 percent of

total volumetric expansion at test pressure and retest dates must be steel stamped on the outer exposed metallic surface of the cylinder neck, or marked on a label securely affixed to the cylinder and overcoated with epoxy. Reheat treatment or repair of rejected cylinders not authorized.

f. Cylinders subjected to action of fire must be removed from service.

g. Cylinders are authorized only for use as equipment components aboard aircraft or marine craft specifically identified to the OHMEA.

h. Maximum filling density for carbon dioxide and bromotrifluoromethane gases, must be such that the pressure in the cylinder at 130 degrees F does not exceed 5/4 times the marked service pressure.

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle, rail freight, cargo vessel, cargo aircraft only, and passenger aircraft.

10. MODAL REQUIREMENTS: A current copy of this exemption must be carried aboard each cargo vessel and aircraft used to transport packages covered by this exemption. The shipper must furnish a current copy of this exemption to the air carrier before or at the time the shipment is tendered.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this exemption and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

- All terms and conditions prescribed in this exemption and the Hazardous Materials Regulations, Parts 171-180.
- Registration required by § 107.601 et seq., when applicable.

Each "Hazmat employee", as defined in § 171.8 who performs a function subject to this exemption must receie training on the requirements and conditions of this exemption in addition to the training required by §§ 172.700 through 172.704.

No person may use or apply this exemption, including display of its number, when the exemption has expired or is otherwise no longer in effect.

12. REPORTING REQUIREMENTS: The carrier is required to report any incident involving loss of packaging contents or packaging failure to the Associate Administrator for Hazardous Materials Safety (AAHMS) as soon as practicable. (Sections 171.15 and 171.16 apply to any activity undertaken under the authority of this exemption.) In addition, the holder(s) of this exemption must also inform the AAHMS, in writing, as soon as practicable of any incidents involving the package and shipments made under this exemption.

Issued at Washington, D.C.

SEP 27 2000

(DATE)

For Robert A. McGuire
Associate Administrator
for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, Department of Transportation, Washington, D.C. 20590. Attention: DHM-31.

The original of this exemption is on file at the above office. Photo reproductions and legible reductions of this exemption are permitted. Any alteration of this exemption is prohibited.

Copies of exemptions may be obtained from the AAHMS, U.S. Department of Transportation, 400 7th Street, SW, Washington, DC 20590-0001, Attention: Records Center, 202-366-5046.

PO: sln